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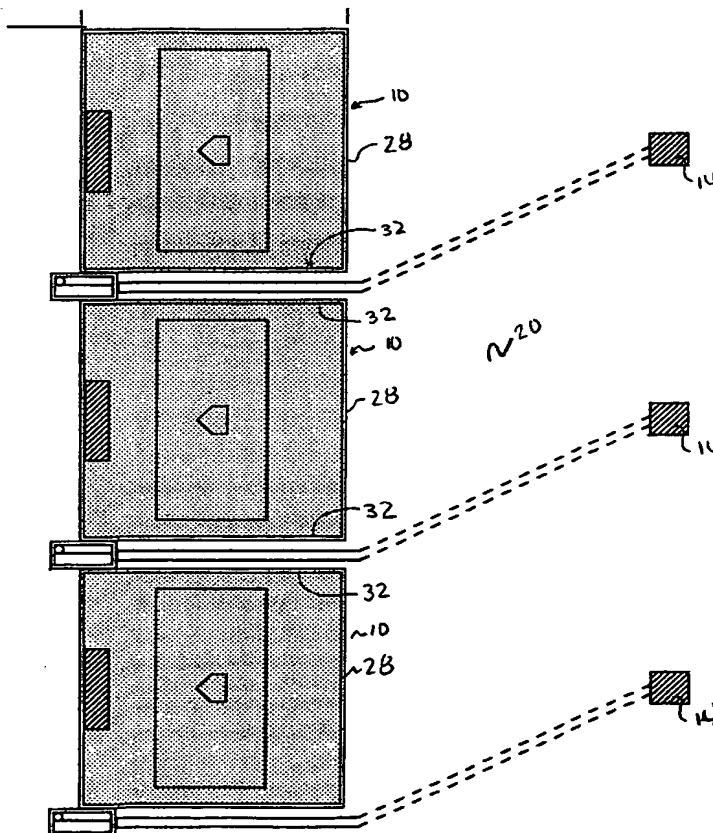
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[Continued on next page]

(54) Title: **BATTING SYSTEM**



(57) Abstract: A batting system wherein the ball hopper is located proximate a batting position and a pitching machine (14) is located at a pitching position with a ball transport system for conveying baseballs from the ball hopper (112) to the pitching machine (14). The system provides for the continuous operation of the pitching machine without the need of an operator to approach the pitching machine (14). In addition, the batting system allows multiple batting systems to use continuously the same field (20) as well as use a field also used as part of a golf driving range (99).



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BATTING SYSTEM

Cross-Reference to Related Applications

This application claims priority to US Provisional Application 60/350,299
5 entitled "Open Loop Batting System," filed January 15, 2002, the entire disclosure of
which is incorporated herein by reference.

Field of the Invention

The invention generally relates to recreational sporting equipment and
0 more specifically to a batting system for practicing hitting a baseball.

Background of the Invention

In prior art batting systems, a pitching machine pitches a baseball
toward a batter who is supposed to hit the pitched baseball with his/her bat. The
5 batter stands within an enclosure, or cage, and the baseball is pitched toward the
batter by the pitching machine. Generally when the batter strikes the baseball,
he/she has little feedback on the baseball trajectory because the baseball trajectory
is restrained by the enclosure. The trajectory of the baseball is interrupted so that
the batter cannot see where the baseball would normally hit the ground. As a
0 result, the batter never realizes how far the baseball may have gone, or knows the
ultimate trajectory resulting from his/her swing the batter may have used on the
pitch. In the event the batter misses the baseball, the baseball hits netting located
behind the batter. Generally, the baseball, whether hit or missed, is automatically
collected. The majority of collection systems rely on gravity to roll the baseball to a
5 central collection point. Collection systems are generally required to avoid having
the baseballs collect at the feet of the batter. In some cases, a baseball once
collected may be transported back to a hopper on the pitching machine, thereby
permitting the baseball to be pitched again.

In other batting systems, the pitching machine might be located in an
0 open field into which a baseball may be hit, providing baseballs to the machine can
then pose a problem. Pitching machines are of one of two types. In the first type,
an operator individually places the baseballs in the pitching machine. In the second
type, baseballs are placed in a hopper on the pitching machine.

Based on the foregoing, it is an object of the present invention to overcome the problems and drawbacks associated with the prior art.

Summary of the Invention

5 The invention in one aspect is a batting system having a baseball
hopper, pitching machine, and a baseball transport arranged for operation with the
baseball hopper located proximate a batting position, i.e., near to a batter. The
pitching machine is located in a field at a normal pitching distance from the batting
position. The baseball transport moves a baseball from the baseball hopper to the
10 pitching machine so that the batter can strike the baseball and observe its trajectory
as it travels into an open field. As a result of the positioning of the baseball hopper
and the pitching machine, nobody needs enter the field to put baseballs in the
baseball hopper.

 Generally, the batter is standing in a cage having an open side toward
15 the field. The pitching machine is positioned to pitch a baseball through the open
side of the cage to the awaiting batter. A baseball properly struck by the batter will
exit the cage through the open side and land in the field. If the baseball is not
properly struck, e.g., a foul or not struck, the baseball will hit netting that makes up
the cage. For the baseballs that remain in the cage, a baseball collection system
20 accumulates the baseballs for reuse by a subsequent batter.

 A multiple batting system arrangement may be utilized in conjunction
with a common field. Each batter may be in an individual cage. In such a multiple
batting system arrangement, individual baseball hoppers may be provided as well
as individual collection systems for accumulating the baseballs missed and/or
25 fouled off by the batter.

 The batting system may also be used in conjunction with a golf driving
range. The batting systems and the golf driving range may be oriented such that
properly struck baseballs and golf balls would fall within a common field.

Brief Description of the Drawings

Figure 1 shows a top view of a general layout of a single batting system.

Figure 2 shows a front view of the cage of FIG. 1 taken along line 2-2.

Figure 3 shows a side view of the cage of FIG. 1 taken along line 3-3.

5 Figure 4 shows a top view of multiple batting systems using a common field.

Figure 5 shows a top view of another embodiment of multiple batting systems using a common field.

Figure 6 shows a perspective top view of a baseball hopper atop a baseball transport.

10 Figure 7 shows a side view of one type of baseball transport.

Figure 8 shows a side view of another type of baseball transport.

Figure 9 shows a side view of a pitching machine.

Figure 10 shows a cross-sectional view of a baseball for use with the present invention.

15 Figure 11 shows a side view of a baseball for use with the present invention.

Figure 12 shows a side view of another baseball for use with the present invention.

Figure 13 shows a top view of a golf/batting range.

Detailed Description and Preferred Embodiments

20 As shown in Figures 1-3, the batting system, generally denoted by the reference number 10 includes a baseball hopper 12, a pitching machine 14, and a baseball transport 16. The baseball transport 16 conducts baseballs 18 from the baseball hopper 12 to the pitching machine 14. When installed, the pitching
25 machine 14 is positioned at a pitching position in a field 20 at a pitching distance 22 from a batting position designated by a plate 24. The pitching distance 22 is determined by the application based on such factors as the characteristics of the pitching machine 14, and the time needed by a batter (not shown) standing at the plate 24 to acquire visually and to react physically to a baseball 18 pitched by the
30 pitching machine 14.

As stated above, the pitching machine 14 is positioned in the field 20. The field 20 is an area into which a baseball 18 properly struck by a bat (not shown) swung by the batter (not shown) will land. The plate 24 is located within a cage 26 having an opening 28 located such that a baseball 18 being pitched from the

pitching machine 14 toward the plate will pass through the opening 28. If the batter properly strikes the baseball 18 with the bat, the baseball will exit the cage 26 through the opening 28 landing in the field 20. Thus in this case, the field 20 begins at the opening 28 (depicted by a dotted line 30) of the cage 26. The placement of the cage 26 and the opening 28 relative to the plate 24 are based on safety considerations, such as the trajectory of baseballs not properly struck by the bat of the batter. The baseball hopper 12 is positioned outside the field 20. The baseball hopper 12 can be placed in almost any location. In certain applications, the baseball hopper 12 is placed proximate the plate 24, where the batter will be located. While the baseball hopper 12 is shown placed outside the cage 26, this is not a requirement of the invention as it could be placed within the cage, if desired. While the baseball hopper 12 has been shown outside the field 20, it could be positioned in the field, if desired, as long as the batter (or other person) does not have to step upon the field to put baseballs 18 in the baseball hopper 12.

The cage 26 has sides 32, and a top 34 made from an openwork structure 35, such as netting made from knotted nylon. A door 36, which also may be made from an openwork structure 35, provides access into the cage 26 through a side 32, such that a batter does not have to step upon the field 20 to enter the cage through the opening 28.

Behind the plate 24 is a baseball catcher 38 having an opening 40. The baseball catcher opening 40 is positioned to allow a baseball 18 that is pitched but not struck by the bat of the batter to enter the baseball catcher 38. Preferably, the opening 40 is also large enough to permit some improperly struck baseballs 18, more commonly referred to as foul tips, to enter the baseball catcher 38. The baseball catcher 38 has a back wall 42 (the wall struck by an unstruck-pitched baseball) at an angle other than perpendicular to a direction of travel 44 of a pitched baseball 18, such that the baseball is deflected toward the ground 46. Preferably, the back wall 42 is structured such that it deflects when hit by a baseball 18 to absorb some of the momentum of the baseball. Suitable materials for the back wall 42 include vinyl. Typically, baseballs 18 will collect at the bottom of the baseball catcher 38.

The ground 46 within the cage 26, however, may be contoured to the horizontal 47 to permit baseballs 18 that land within the cage to roll, due to gravity, to a trough 48. A drain 50, which also employs gravity, may also be provided to

permit the baseballs 18 to be directed outside the cage 26 to a collection center (not shown). Placed between the plate 24 and the ground 46 is a mat 52. The mat 52 defines an area in which a batter stands. The mat is preferably sized to accommodate both left- and right-hand batters.

5 As shown in Figure 4, multiple batting systems 10 can be placed one beside the other. While three batting systems 10 are depicted, the ultimate number is application dependent. Where batting systems 10 are placed beside each other, duplication of adjacent sides 32 may not be required. When units are placed side by side, preferably each opening 28 is oriented toward a common field 20. In this
10 arrangement, all the pitching machines 14 are also located in the same common field 20.

Figure 5 depicts another multiple batting system 110 embodiment. As this embodiment has many features that are similar to features in the previously discussed embodiment, similar elements will be given the same reference number
15 preceded by the number 1. In this embodiment, the baseball hoppers 112 for the several batting systems 110 are commonly located, as is a collection point 54.

Depicted in Figure 6, is a baseball hopper 12 mounted atop the baseball transport 16. The baseball hopper 12 has a bottom 56 that is angled (when installed) such that baseballs 18 positioned in the baseball hopper roll by gravity
20 into a channel 58. (See Figure 1) The channel 58 has a cross-section and length such that a plurality of baseballs 18 aligns seriatim in the channel. The channel 58 also has a pitch, when installed, such that baseballs 18 in the channel roll toward a bore 60 that is sized to permit the baseballs 18 to exit seriatim the baseball hopper 12 into the baseball transport 16.

25 Referring to Figure 7, the baseball transport 16 has a ball escapement 62 that dispenses one baseball 18 at a time. The ball escapement 62 employs a pivoted gate 63 that rotates about an axis 64. Depending upon the location of the baseball transport 16 relative to the batter, noise created by the movement of the pivoted gate 63 may provide an audible signal to the batter that a baseball 18 is about to be
30 pitched. The baseball transport 16 also includes a conduit 66 that terminates at the pitching machine 14 (See Figure 1). The baseball 18 is transported through the conduit 66 by a ball conveyor 68, such as a pneumatic system utilizing a fan. The conveyor 68 has a discharge 70 coupled to the conduit 66. While a pneumatic

system has been shown, other alternates for the conveyor 66, such as belts, are considered within the scope of the invention.

Continuing with Figure 7, the bore 60 of the baseball hopper 12 is connected to the ball escapement 62 by a conduit 72. In operation, debris and/or water, collectively 74, may enter the conduit 72 through the bore 60. The conduit 72 has a slot 76 positioned over a trough 78 such that the debris and water 74 falls due to gravity through the slot into the trough. The trough 78 has an incline (when installed) such that debris and water 74 exits the trough due to gravity through an end of the trough.

Figure 8 depicts an alternate embodiment of a baseball transport 216. As many of the features of this embodiment are similar to the embodiment discussed above similar numbers preceded by the number 2 will be used for similar elements. In this embodiment, the ball escapement 262 employs a pawl 80. By the action of the pawl 80, a baseball 218 is released while simultaneously baseballs 218 in the queue to be released are held. As with the previous embodiment, the action of the pawl 66 may function as an audible signal indicating the imminent pitching of a baseball 218.

A baseball 218 is released by the pawl 80 into an airlock 82. The airlock 82 includes a piston 84 with a through bore 85. The piston 84 in a first location positions the bore 85 to receive the released baseball 218. After the baseball 218 is within the bore 85, the piston 84 repositions the bore over the conduit 266, into which the baseball 218 drops due to gravity. The conduit 266 into which the baseball 218 drops connects to the pitching machine 14. The action of the airlock 82 may also function as an audible signal indicating the imminent pitching of a baseball 218.

As shown in Figure 9, the pitching machine 14 has a back 86, a top 87, and a front 88. As shown in Figure 1, the back 86 is oriented away from the plate 24 and the front 88 is oriented toward the plate. Continuing with Figure 9, the conduit 66 defines an arch A from the back 86 into the top 87 of the pitching machine 14. In a portion of the arch A visible to a batter, the conduit 66 has a port 89, created by removing a portion from the conduit 66, to permit the batter to view the baseball 18 immediately prior to the baseball entering the pitching machine 14. The port 89 could also be created by a transparent or translucent section of conduit 66. In applications where any portion, or all of, the conduit 66 lays on the ground, the

conduit may be entirely transparent or translucent to permit the batter to view the baseball 18 as it travels away from the cage 26 toward the pitching machine 14.

The conduit 66 places a baseball 18 into a baseball feed chute 90 of the pitching machine 14 that directs the baseball into contact with a wheel 91. The wheel 91, which is rotating in the direction indicated by the arrow, "pitches" the baseball 18 toward the plate 24. (See Figure 1). Referring to Figure 1, the pitching machine 14 has a controller 92 located out of the field 20, preferably proximate the batting position indicated by the plate 24. The controller 92, which is connected to the pitching machine 14 by a cable 93, has knobs and switches for regulating the speed of the pitch (preferably between about 15 and 60 miles/hours), and turning the pitching machine on or off. Alternatively, the controller 92 could be positioned at or on the pitching machine 14, or at a location out of the field 20 remote from the batter. A suitable pitching machine is a JUGS Jr. from The Jugs Company of Tualatin, Oregon.

Continuing with Figure 10, the baseball 18 is sized to be compatible with the selected pitching machine 14. The baseball 18 is made from an open cell flexible foam using an integral skin forming process. The baseball 18 is molded in accordance with Process Specification No. Hollrock 435738115 by S.S.F. Molders of Two Rivers, Wisconsin. The baseball 18 has a cover 94 that is harder than the core 95. For safety, the baseball 18 is softer than a regulation hardball. The baseball 18 has a diameter of approximately 2 3/4 inches and a weight of approximately 3 ounces. In addition, the cover 94 may have a color selected to contrast with the environment in which it is used to assure better visibility of the baseball 18 to a batter. While any number of colors may be selected, brilliant, strong and vivid colors are preferred (See ISCC-NBS Method of Designating Colors). Colors containing red, orange or yellow are preferred. As shown in FIGS. 11 and 12, the cover 94 may also have impressions 96 therein, such as dimples 97 or laces 98. Impressions 96 may be designed to assist in the flight of the baseball 18 both during pitching and after being struck.

Figure 13 depicts a golf/batting range employing the present invention. The golf/batting range has at least one batting system 10 and at least one golf station 99. The at least one batting system 10 is oriented as is the at least one golf station 99 such that a properly struck ball, be it baseball or golf ball, will land in the common field 20.

While the present invention has been described in considerable detail with reference to certain preferred versions thereof, other versions are possible. For example, two versions of a ball escapement have been shown but other ball escapements based on other sequential separators are considered within the scope of the invention. Therefore, the spirit and scope of the invention should not be limited to the description of the preferred versions contained herein.

What is claimed is:

1. A batting system for use by a batter at a batting position comprising:
a baseball hopper for location proximate the batting position;
a pitching machine at a pitching position spaced from the batting position for
pitching baseballs toward the batting position, and
5 a baseball transport for receiving baseballs from the baseball hopper and
delivering the baseballs to the pitching machine.
2. The batting system of claim 1 further comprising a cage surrounding the
batting position and having an opening oriented toward the pitching
machine such that a baseball when pitched enters the cage through the
opening of the cage.
3. The batting system of claim 1 further comprising a ball collection receiver
proximate the batting position, and having an opening to receive a pitched
baseball from the pitching machine
4. The batting system of claim 1 wherein the baseball transport includes a ball
conveyor and a ball escapement in communication with one another and
with the hopper for delivering baseballs seriatim to the pitching machine
5. The batting system of claim 4 wherein the ball conveyor includes a
pneumatic system.
6. The batting system of claim 5 further comprising an airlock between the ball
escapement and the ball conveyor.
7. The batting system of claim 4 wherein the ball escapement includes a
pivoted gate.
8. The batting system of claim 1 further including a plurality of baseballs of
identical geometry and construction, each having a foam core and a
covering integrally molded with the foam core.

9. The batting system of claim 1 further including a controller coupled to the pitching machine for location proximate the batting position
10. A batting system comprising:
a baseball hopper;
a pitching machine, and
a baseball transport having a ball conveyor for moving baseballs from the
baseball hopper to the pitching machine
11. The batting system of claim 10 wherein the ball conveyor includes a pneumatic system.
12. The batting system of claim 11 wherein the baseball transport includes a ball escapement
13. The batting system of claim 12 wherein the ball escapement includes a pivoted gate
4. The batting system of claim 10 further including a plurality of baseballs of identical geometry and construction, each having a foam core and a covering integrally molded with the foam core
15. A golf/batting range comprising:
at least one batting system having a baseball hopper; a pitching machine, and a baseball transport having a ball conveyor for moving baseballs from the baseball hopper to the pitching machine; and
at least one golf station wherein the at least one batting system and the at least one golf station share a common field.
16. A method of making a baseball for use with a pitching machine comprising the steps of:
molding an open cell flexible foam into a baseball whereby the foam is given an integrally formed cover over a core, the cover being harder than the core

17. The method of claim 16 wherein the molding is accomplished by an integral foam forming process.
18. A baseball for use with a pitching machine comprising:
an open cell flexible foam molded to create a cover surrounding an inner core, the cover being harder than the inner core.
19. The baseball of claim 18 wherein the open cell foam is molded by an integral foam process.
20. The baseball of claim 18 wherein the cover has dimples to improve its flight trajectory characteristics.
21. The baseball of claim 18 wherein the cover has a color classified as strong, brilliant, or vivid.
22. The baseball of claim 21 wherein the color is selected from the group consisting essentially of yellow, red, and orange.

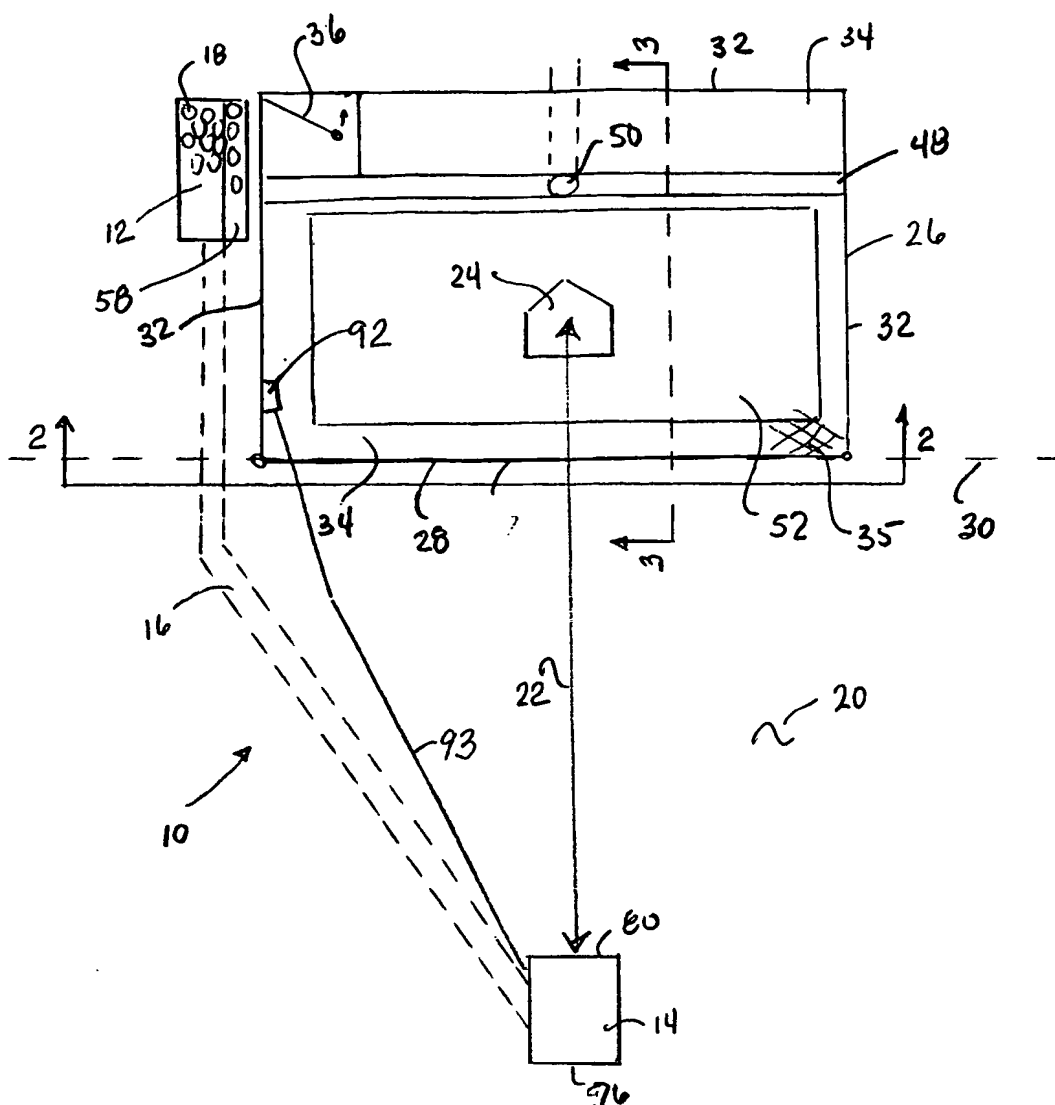


FIG. 1

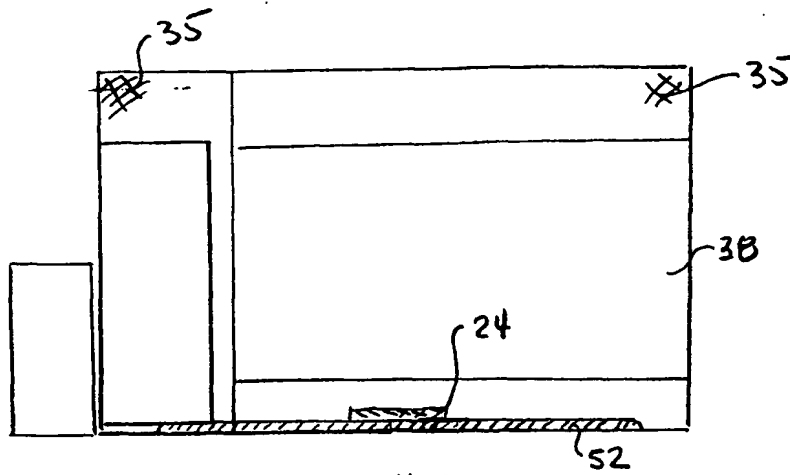


FIG. 2

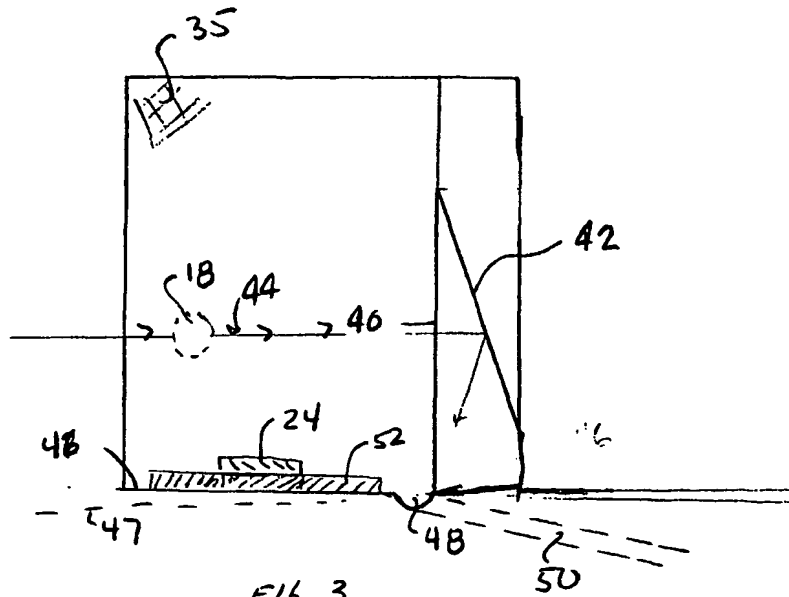


FIG. 3

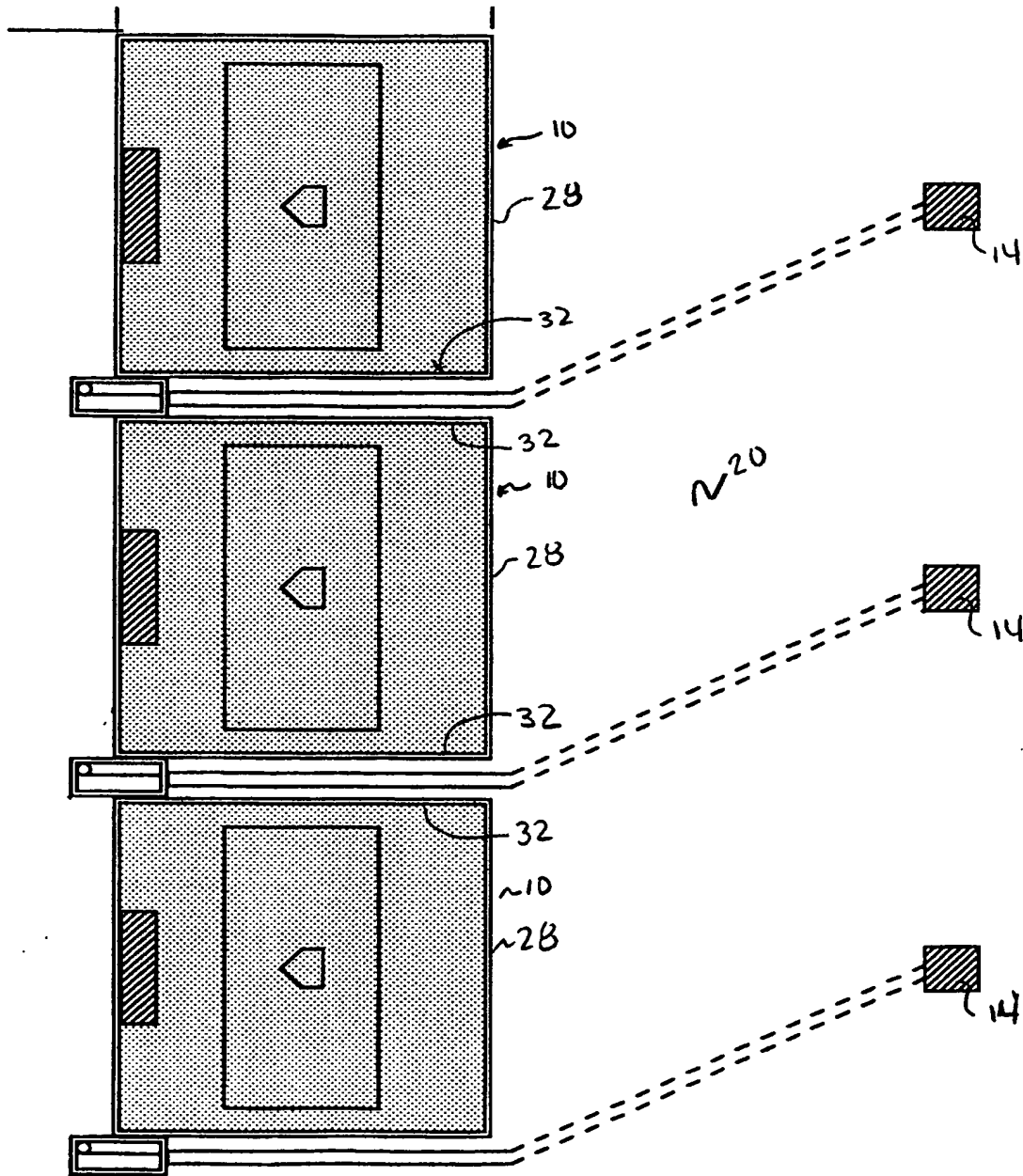


FIG. 4

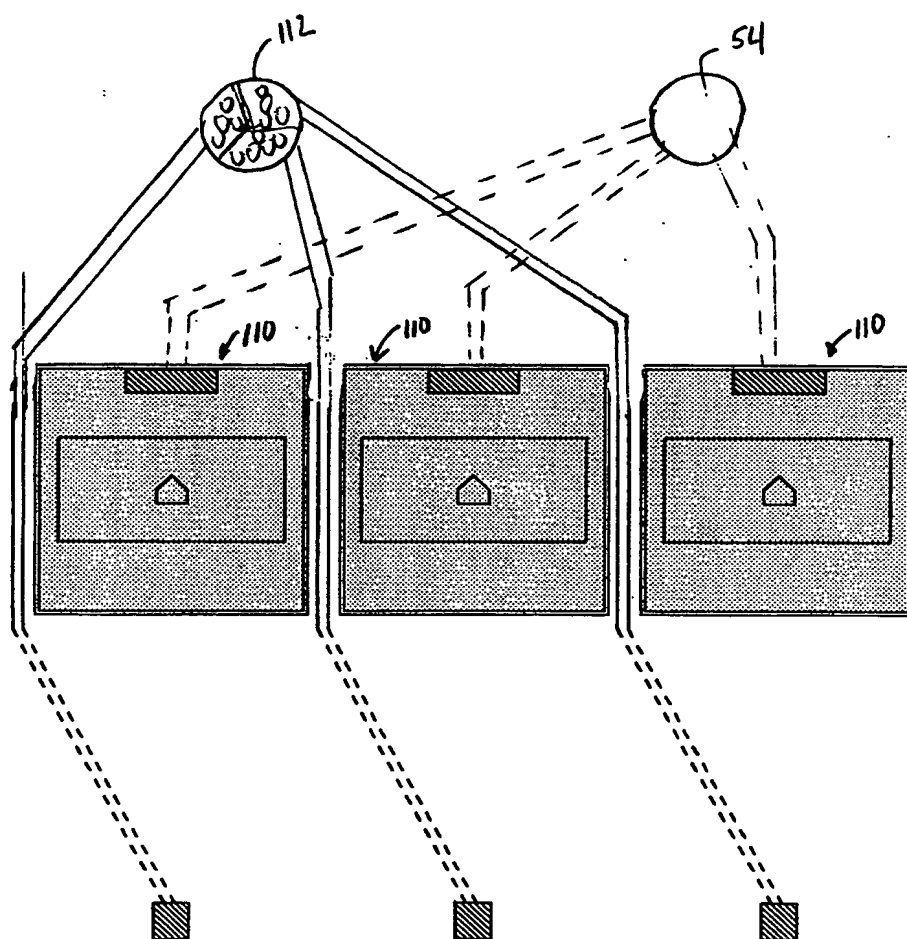
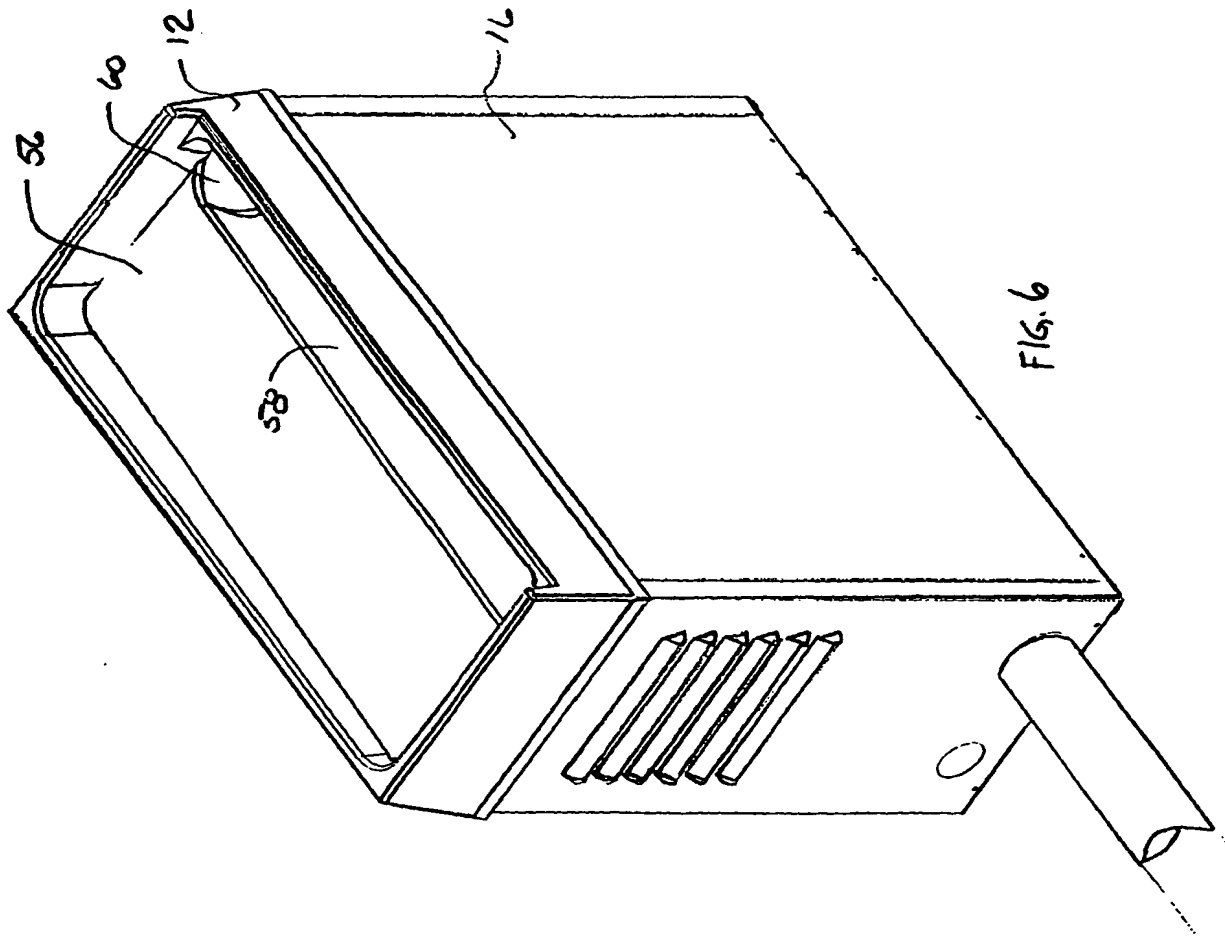
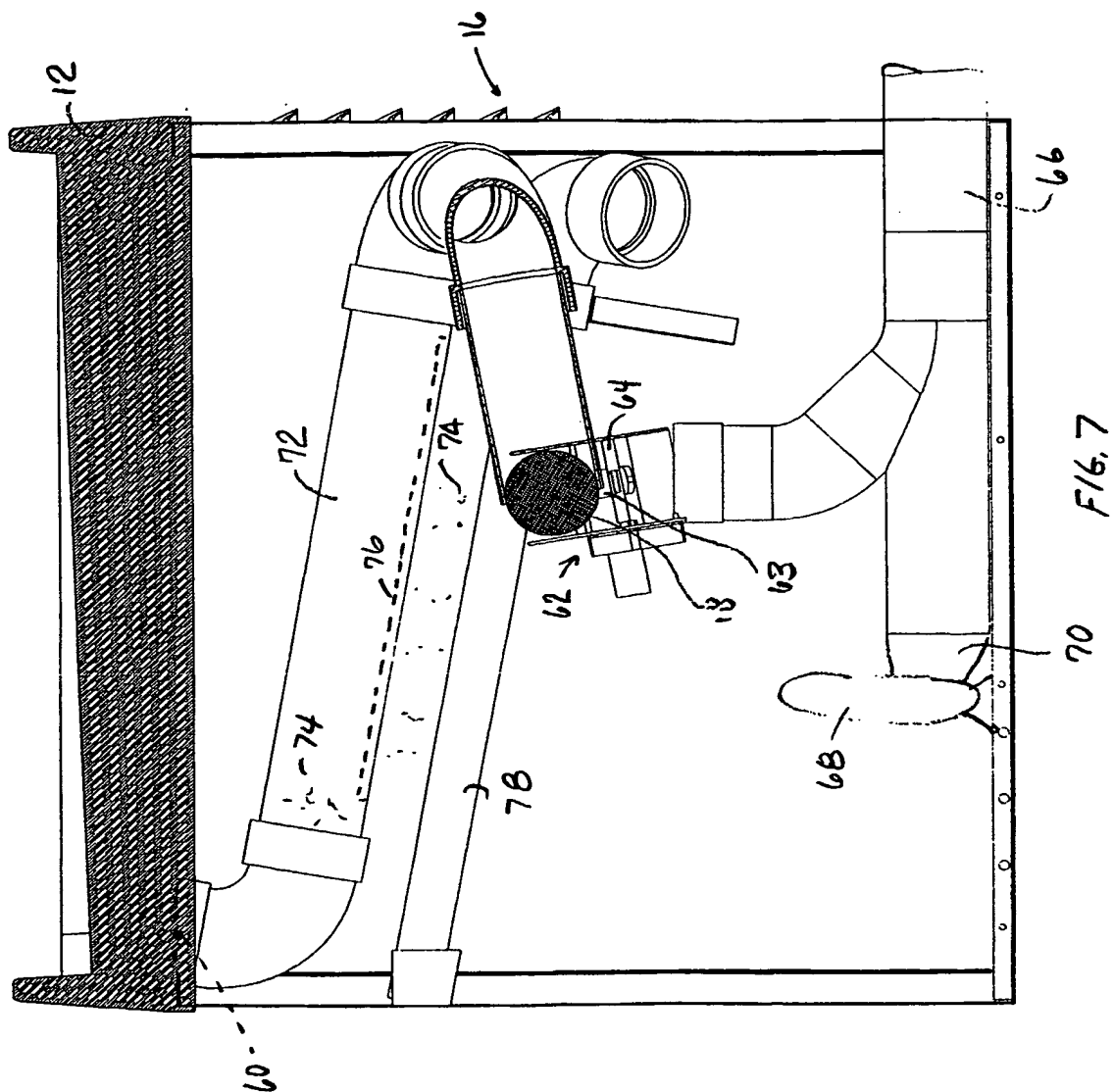


FIG. 5





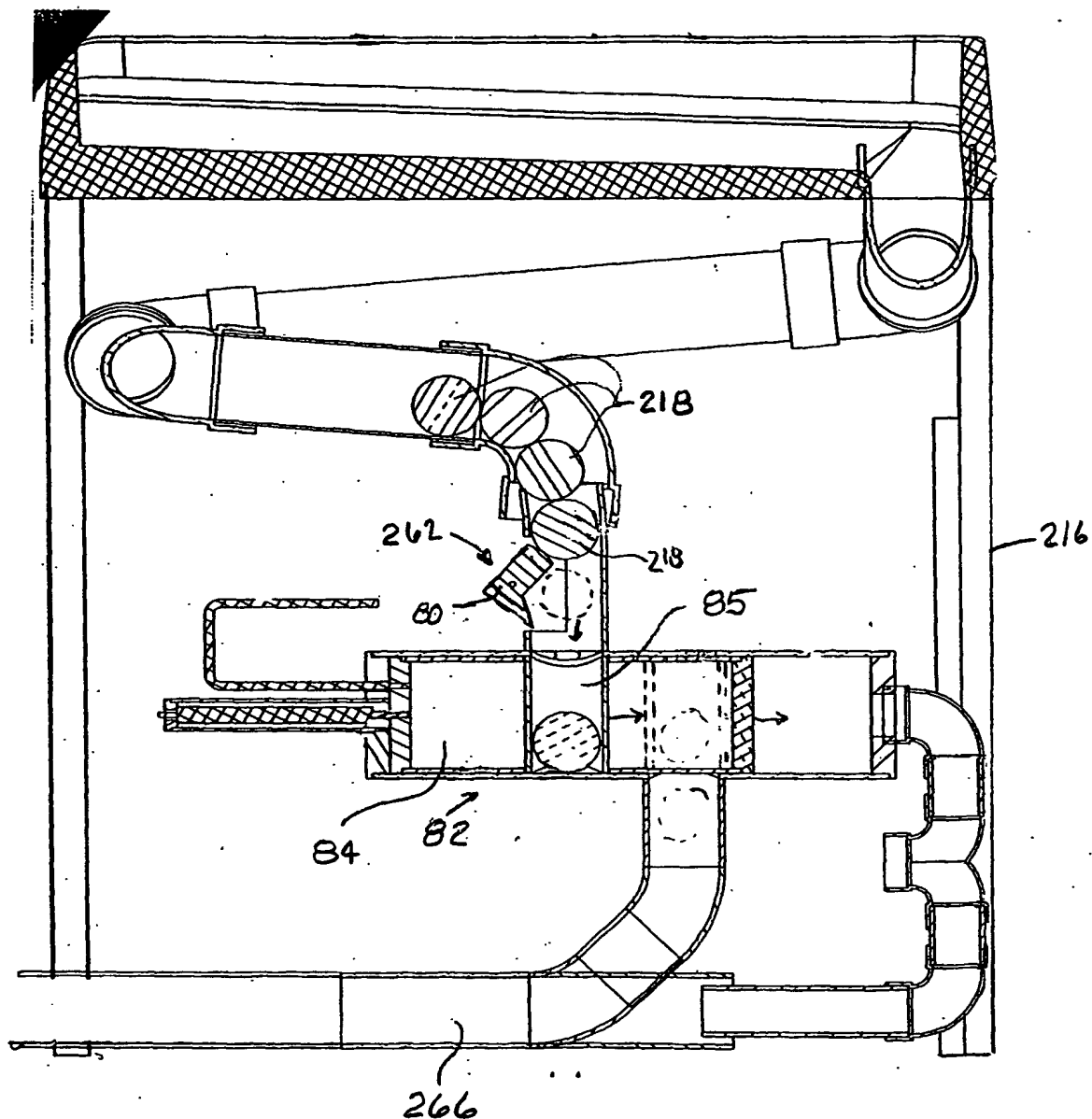


FIG. 8

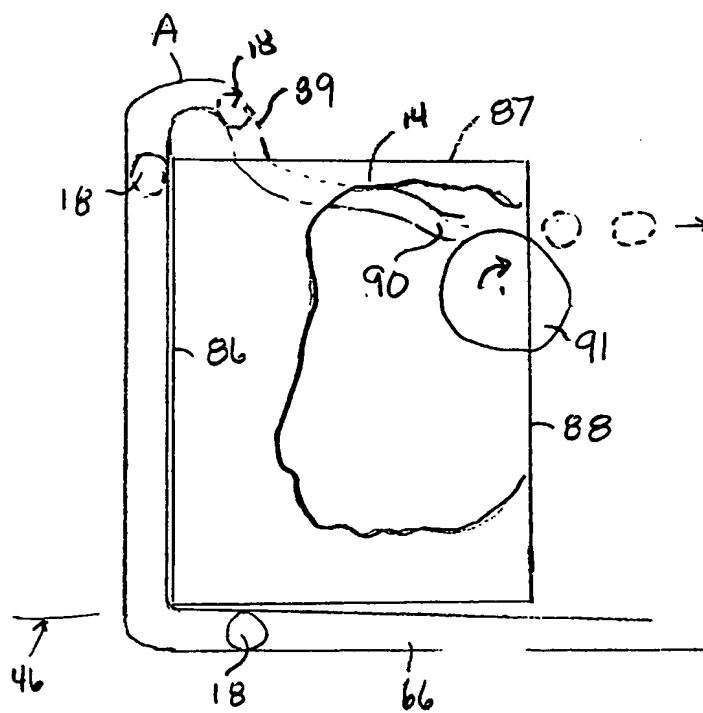
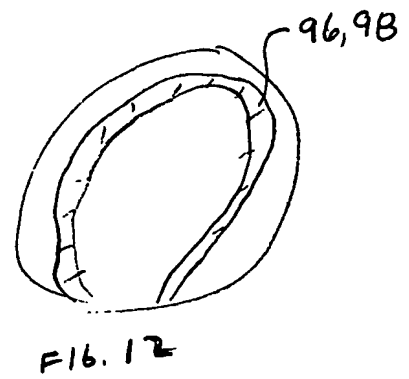
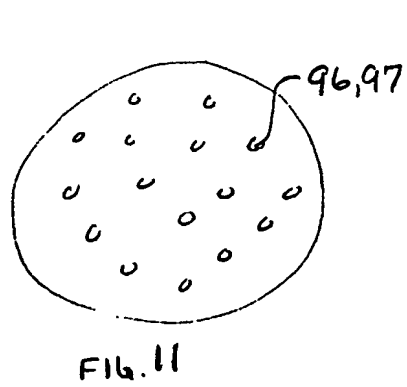
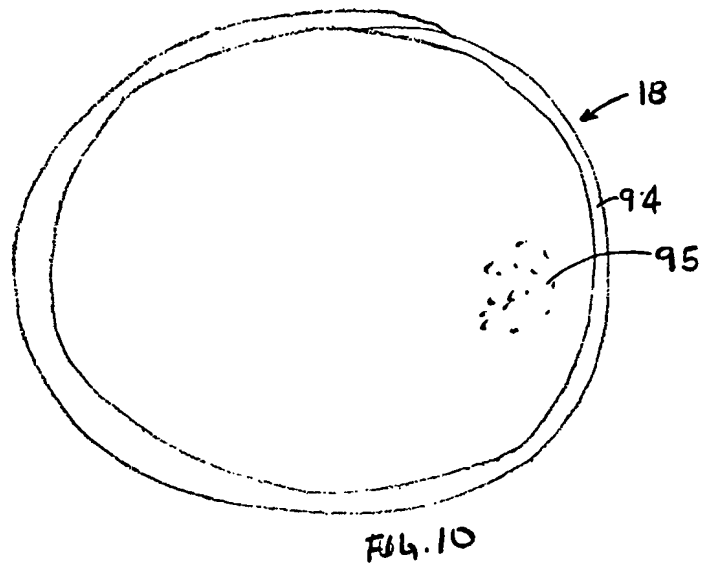


FIG. 9



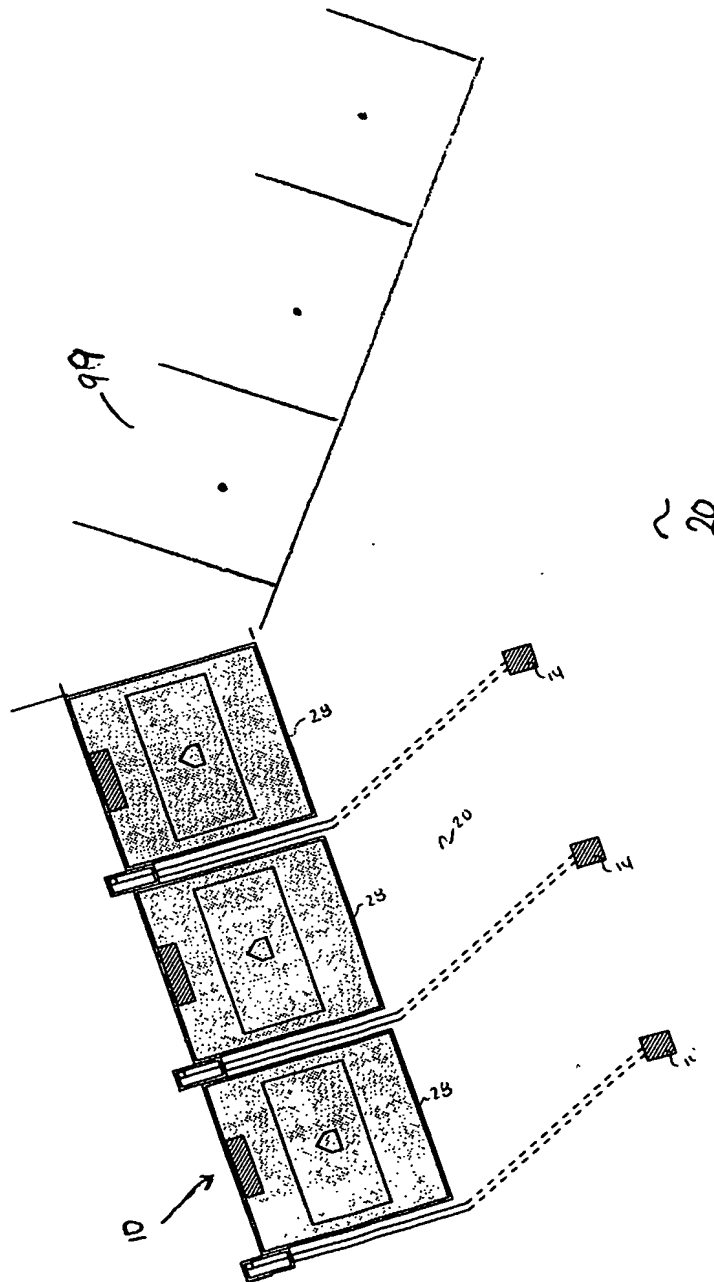


FIG. 13

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/US03/00983**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) :A63B 69/00

US CL :473/451

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 473/421, 422, 451,468 FOR107
124/56, 64, 71, 73

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

East- search terms- baseball, golf, practice, machine

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3,584,614 A (HORVATH) 15 June 1971, See entire article	1-22
Y	US 3,855,988 A (SWEETON) 24 December 1974, See entire article	1-22
Y	US 4,027,646 A (SWEETON) 07 June 1977, See entire article	1-22
Y	US 3,905,349 A (NIELSEN et al) 16 September 1975, See entire article	1-22
Y	US 4,270,511 A (EHAMA) 02 June 1981, See entire article	1-22
Y	US 4,212,284 A (SPEER) 15 July 1980, See entire article	1-22

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US03/00983

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim
Y	US 4,502,455 A (STOKES) 05 March 1985, See entire article	1-22
Y	US 5,044,350 A (IWABUCHI et al) 03 September 1991, See entire article	1-22
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Y	US 5,257,615 A (JONES) 02 November 1993, See entire article	1-22
Y	US 5,507,271 A (ACTOR) 16 April 1996, See entire article	1-22
Y	US 5,887,578 A (BACKERIS et al) 30 March 1999, See entire article	1-22

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